

REMARKS

Claims 1-15 are pending in the application. Independent claims 1 and 15 have been amended to more particularly point out and claim the invention. In particular, claims 1 and 15 have been amended to recite that a position detection signal switching means outputs an inverted detection signal during a starting period of the motor. Support for this amendment is found at least in the original specification at page 31, line 20 to page 35, line 13 (see particularly page 34, lines 4-17). Claims 1, 4, 5, and 15 have been amended to correct various informalities objected to by the Examiner. No new matter has been added by the foregoing amendments.

Objections to the Claims

The Examiner objected to claims 1-15 for various informalities. In particular, claims 1 and 15 were each objected to for recitation of the phrase “in accordance with the present invention”. Claims 1 and 15 have been amended to delete the phrase “in accordance with the present invention”. Claims 1, 4, and 5 were further objected to for antecedent basis issues. Claims 1, 4, and 5, (as well as claim 15) have been amended to address the antecedent basis issues. Applicants respectfully submit that the Examiner’s objections regarding the claims have been addressed, and Applicants respectfully request that the Examiner’s objections to the claims be withdrawn.

Claim Rejection – 35 U.S.C. § 102 – claims 1-3

The Examiner has rejected claims 1-3 under 35 U.S.C. § 102(b) as being anticipated by JP 04-222489 (Morihiro *et al.*, hereinafter “Morihiro”) The Examiner asserts that Morihiro discloses the invention as claimed in claims 1-3. The rejections of claims 1-3 are respectfully traversed.

Referring in particular to the English translation of the abstract, Morihiro discloses a speed controller for a brushless DC motor. The controller comprises an inverter transistor circuit 7 operatively coupled to a distributing circuit 4. A position detector 1 is provided, and is operatively coupled to a forward/reverse rotation changeover circuit 6. A reverse rotation detector 5 is operatively coupled to a comparator 3, which in turn is operatively coupled to the distributing circuit 4. In operation, Morihiro discloses:

...
“[w]hen it changes into a **reverse rotation command**, a forward reverse rotation changeover circuit 6 is changed over on the side of reverse rotation, and the logic condition from the position detector 1 is inverted and the synchronous motor 8 is inverted. When the speed of the synchronous motor 8 **exceeds the speed of the speed command**, the output of the comparator 3 is inverted, and the distributing circuit distributes signals that turn the transistors UP, VP, and WP on and the the FET's UN, VN, and WN off, and power generation is braked. When the motor speed **drops below the speed of the speed command**, the distributing circuit 4 distributes a driving signal to the inverter transistor circuit 7 again. This way, power generation is braked intermittently in driving of reverse rotation, and the synchronous motor is controlled into the speed in accord with the speed command. (Emphasis added.)

Morihiro thus discloses a speed controller adapted to control motor operation when the motor is commanded to reverse direction of rotation. The speed controller of Morihiro is further adapted to maintain a speed set point.

Claim 1, as amended, recites, *inter alia*,

...
and that said position detecting means is provided with position detection signal switching means that carries out switching between a detection signal for detecting the rotation position of said rotor and an inverted detection signal generated by inverting the logic of said detection signal and outputs the obtained signal in response to voltage comparison signals obtained by a comparison of outputs between each of the terminal voltages of said windings of non-activation phases and the neutral point voltage of the common potential of said windings of a plurality of phases,

the output signal of said position detection signal switching means is used as said position signal during the ON operation of said high-frequency switching operation, and

said position detection signal switching means outputs said inverted detection signal as said position signal at the beginning of starting. (emphasis added)

Claim 1 has been amended to clarify that the position detection signal switching means outputs an inverted detection signal for use as a position signal during a start-up period of motor operation. As discussed in detail in the specification at page 31, line 20 to page 35, line 13, the

present invention is directed to the problem of providing stable sensorless PWM (Pulse Width Modulation) control of a motor during start-up conditions. To provide stable control during startup, the position detection signal switching means outputs an inverted detection signal as a position signal. As discussed in the original specification, the inverted signal negates the effect of an induced voltage which would otherwise potentially cause control instability. See page 33, line 9 through page 35, line 2.

Morihiro fails to disclose at least the feature of a position detection signal switching means outputting an inverted detection signal as a position signal at the beginning of starting of a motor. The device of Morihiro is disclosed to be operative during change of direction of rotation of the motor, as well as when the motor is operating near a speed set point. The device of Morihiro is not directed to solving the problem of providing stable sensorless PWM control of a motor during start-up conditions, and is completely silent on the motor control during start-up conditions.

As Morihiro fails to disclose each and every element of claim 1, as amended, Applicants respectfully submit that claim 1, along with claims 2 and 3 depending from claim 1, are not anticipated by Morihiro, and request that the rejection of these claims under 35 U.S.C. § 102(b) be withdrawn.

Claim Rejection – 35 U.S.C. § 103 – claim 15

The Examiner has rejected claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Morihiro in view of U.S. Patent No. 5,886,489 (Rowan *et al.*, hereinafter “Rowan”). The Examiner states that Morihiro fails to disclose a disk drive including a head means and an information processing means. The Examiner relies upon Rowan for disclosure of a disk drive apparatus having a head means and an information processing means. The Examiner asserts that it would have been obvious to implement the control system of Morihiro into a disk drive system that uses a brushless DC motor, to provide the advantages inherent to brushless motors, as taught by Rowan. Applicants respectfully traverse this rejection.

When making a rejection under 35 U.S.C. § 103, the Examiner has the burden of establishing a *prima facie* case of obviousness. The Examiner satisfies this burden only by

showing (1) some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the references, (2) a reasonable expectation of success and (3) the prior art references much teach or suggest all of the claim limitations (see MPEP 706.02(j)). The teaching or suggestion to make the claim combination and reasonable expectation of success must be found in the prior art and not from the applicant's disclosure (see MPEP 706.02(j)). Further, the mere fact that the prior art could be modified in the manner proposed by the Examiner, does not make the modification obvious unless the prior art suggests the desirability of the modification. *Ex parte Dussaud*, 7 U.S.P.Q. 2d 181, 1820 (PTO Bd. App. & Int. 1988).

Rowan discloses an apparatus and method for reducing spindle power and acoustic noise in a disk drive by adjustment of the commutation angle of the motor until a point of optimum power consumption is reached. The apparatus of Rowan includes a disk drive motor 5 operatively coupled to a disk drive assembly 4. A disk controller 10 is disclosed to control rotation of the disk assembly 4. With reference to Fig. 1, the disk assembly 4 is disclosed to rotate in a single direction, shown by the arrow proximate the schematic representation of the disk drive motor 5 and disk assembly 4.

Similar to claim 1, claim 15, as amended, recites in pertinent part:

...
said position detection signal switching means outputs said
inverted detection signal as said position signal at the beginning of
starting.

Morihiro and Rowan are not properly combinable under 35 U.S.C. § 103(a). Morihiro is directed to a motor speed controller adapted to control the motor when direction of rotation of the motor is commanded. The disk drive of Rowan is disclosed to rotate in only one direction (that being the direction of the arrow proximate the disk assembly 4 in Fig. 1). The artisan having the disclosures of Morihiro and Rowan before him or her would not recognize any motivation to incorporate the speed controller of Morihiro adapted for control of a bi-directional motor with the uni-directional motor of Rowan. Still further, the Examiner has failed to identify any advantage to be realized by combining the speed controller of Morihiro with the device of Rowan, which already comprises a satisfactorily controlled disk drive motor.

However, assuming *arguendo* that Rowan is properly combinable with Morihiro, Morihiro and Rowan, both in the proposed combination and individually, fail to disclose at least the feature recited in claim 15, as amended, of a position detection signal switching means which outputs an inverted detection signal as a position signal during start up of a motor.

Neither combination nor modification of Morihiro and Rowan is taught or suggested by the prior art. Even if combined, the proposed combination would fail to teach, disclose or suggest all of the elements of claim 15. It is therefore respectfully submitted that a *prima facie* case for obviousness has not been established with respect to claim 15. Accordingly, it is respectfully requested that the rejection of claim 15 under 35 U.S.C. § 103(a) be withdrawn.

Allowable Subject Matter

Applicants acknowledge with appreciation that the Examiner has found claims 4-14 to be allowable if rewritten in independent form. In view of the foregoing remarks, Applicants respectfully request reconsideration of claims 4-14 in their original dependent form.

CONCLUSION

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application, including claims 1-15, is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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February 7, 2006
(Date)

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